

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace prior versions and listings of claims in the application:

**Listing of claims:**

Claims 1, 3-5 have been cancelled and claims 2, 6, 20, 21 and 33 have been amended as follows:

1. (cancelled)
2. (currently amended) A soluble purified Phosphate Regulating Gene with Homologies to Endopeptidases on the X Chromosome PHEX enzyme (secPHEX)<sub>2</sub> and variants thereof, comprising a PHEX ectodomain or catalytic part thereof and a PHEX signal peptide/transmembrane region modified so as to confer solubility to said PHEX enzyme when expressed in a eukaryotic host, wherein said host is not a human being wherein the amino acid residues located from position 27 to position 46 inclusively according to the numbering used in the sequence of SEQ ID NO: 1 have been replaced by the amino acid residues of SEQ ID NO: 4.
3. (cancelled)
4. (cancelled)
5. (cancelled)
6. (currently amended) A mutant of the secPHEX of claim 1, as defined in claim 3 consisting of a Phosphate Regulating Gene with Homologies to Endopeptidases on the X Chromosome PHEX enzyme having the glutamic acid residue at

position 581 according to the numbering used in the sequence of SEQ ID NO: 1  
substituted with a valine residue.

7. (withdrawn) A nucleic acid which comprises a truncated PHEX gene sequence encoding PHEX membrane-anchor domain modified to include a cleavable signal peptide and PHEX C-terminal ectodomain is active or inactive.
8. (withdrawn) A recombinant vector comprising the nucleic acid of claim 7.
9. (withdrawn) A recombinant vector as defined in claim 8, which is an expression vector.
10. (withdrawn) A eukaryotic host comprising the recombinant vector of claim 8, wherein said host is not a human being.
11. (withdrawn) A eukaryotic host comprising the recombinant vector of claim 9, wherein said host is not a human being.
12. (withdrawn) A method for producing a soluble PHEX enzyme or an inactive mutant thereof, which comprises the steps of:
  - allowing the eukaryotic host of claim 10 to express said nucleic acid, and
  - recovering the soluble PHEX enzyme or mutant thereof as a secretion product of said host.
13. (currently amended) An antigenic composition, which comprises the enzyme secPHEX of claim 12.
14. (withdrawn) An antibody capable of binding to PHEX and raised against the enzyme of claim 1 or fragment thereof.

15. (withdrawn) The antibody of claim 14, wherein said fragment extends from residue 121 to residue 294 of the amino acid sequence of PHEX.
16. (withdrawn) An antibody as defined in claim 14, which is a monoclonal antibody.
17. (withdrawn) An antibody as defined in claim 15, which is a monoclonal antibody.
18. (withdrawn) The antibody of claim 16, which is a PHEX neutralizing antibody.
19. (withdrawn) A hybridoma producing the antibody of claim 16.
20. (currently amended) A composition comprising the secPHEX enzyme of claim 4 ~~2 or the nucleic acid of claim 7~~ and a pharmaceutically acceptable carrier.
21. (currently amended) A composition comprising the secPHEX enzyme of claim 3 ~~6~~ and a pharmaceutically acceptable carrier.
22. (withdrawn) A composition comprising the antibody of claim 14 and a pharmaceutically acceptable carrier.
23. (withdrawn) A diagnostic reagent for detecting the presence or amount of PHEX, comprising the antibody of claim 14.
24. (withdrawn) A diagnostic kit for detecting the presence or amount of PHEX comprising the antibody of claim 14.
25. (withdrawn) The diagnostic kit of claim 24, which further comprises a soluble PHEX enzyme.

26. (withdrawn) A method for detecting the presence or an amount of PHEX in a sample, which comprises the steps of:
  - contacting said sample with the antibody of any claim 14 in conditions such that the immune complex can form; and
  - detecting the immune complexes as an indication of the presence or amount of PHEX in said sample.
27. (withdrawn) A device for purifying PHEX or a mutant thereof which comprises the antibody of claim 14.
28. (withdrawn) A device for screening PHEX ligands, which comprises the soluble PHEX enzyme or a mutant thereof as defined in claim 1.
29. (withdrawn) The device of claim 27, wherein said antibody is fixed onto a solid support.
30. (withdrawn) The device of claim 28, wherein said PHEX enzyme or mutant is fixed onto a solid support.
31. (withdrawn) The device of claim 30, wherein said PHEX enzyme or mutant is fixed onto the solid support through its binding to an anti-PHEX antibody itself fixed onto said solid support.
32. (withdrawn) The device of claim 30, wherein said PHEX enzyme or mutant is fixed onto the solid support through a C-terminal amino acid extension ending with a residue or group capable of coupling PHEX to the solid support.
33. (currently amended) A method for obtaining a Phosphate Regulating Gene with Homologies to Endopeptidases on the X Chromosome (PHEX) PHEX-ligand which comprising the steps of:

- contacting a sample containing one or more molecules with a ~~PHEX enzyme or mutant~~ secPHEX as defined in claim ~~1-2~~ in conditions such that binding of said one or more molecules with PHEX can occur;
  - detecting said binding as an indication of the presence of a PHEX ligand in said sample; and
  - selecting said PHEX ligand.
34. (original) The method of claim 33, wherein said ligand is a PHEX inhibitor or substrate.
35. (withdrawn) A method for evaluating the activity of a molecule for its capacity of being a substrate of PHEX comprising the steps of:
- contacting said molecule with the PHEX enzyme of claim 1 in substantially phosphate-free conditions; and
  - observing a cleavage product of said molecule as an indication that the molecule is a PHEX substrate.
36. (withdrawn) The method of claim 35, which further comprises the step of comparing said molecule with PTHrP107-139 as a positive control.
37. (withdrawn) A method for evaluating PHEX activity in a sample which comprises the steps of contacting the sample with a substrate as defined in claim 35, or preferably with PTHrP107-139, in substantially phosphate-free conditions and observing the apparition of a cleavage product of said substrate or PTHrP107-139 as an indication of PHEX activity in the sample.
38. (withdrawn) The method of claim 37, which further comprises a step of comparing said PHEX activity in the sample with the activity of the PHEX enzyme of claim 1 as a positive control.
39. (withdrawn) A method for evaluating the activity of a molecule for its capacity of being an inhibitor of PHEX comprising the steps of:

- contacting said molecule with a substrate as defined in claim 35, or preferably with PTHrP107-139, and the PHEX enzyme of claim 1 in substantially phosphate-free conditions; and
  - observing an inhibition of the formation of a cleavage product as an indication that said molecule is a PHEX inhibitor.
40. (withdrawn) A kit for executing the method of claim 35.